Amendments to the Claims

This Listing of Claims will replace all prior versions and listings of claims in the application:

1. (original) A device for use as a bone implant comprising:

a body having a pre-implantation shape and a post-implantation shape different from the pre-implantation shape;

wherein the body is configured to change from the pre-implantation shape to the post-implantation shape in response to the body being activated; and

wherein the body is configured to be inserted in a bone recess while the body is in the pre-implantation shape.

2. (original) The device of claim 1, wherein the body further comprises a shape memory material.

3. (original) The device of claim 2, wherein the body is configured to change from the pre-implantation shape to the post-implantation shape largely due to the shape memory effect of the shape memory material.

4. (original) The device of claim 1, wherein the body is configured to couple with the bone recess when the body is in the post-implantation shape.

5. (original) The device of claim 1, wherein the body comprises a material that has no significant shape memory effects.

6. (original) The device of claim 1, wherein the post-implantation shape is selected from a substantially cylindrical shape, a dumbell type shape, a cylindrical shape with ridges, and a threaded screw-like shape.

7. (original) The device of claim 2, wherein the shape memory material is configured to fix a cable member to the body.

8. (original) The device of claim 7, wherein the cable member is selected from an animal tissue, a synthetic fiber, a natural fiber, a polymer, a metallic wire, a bundle, and a composite.

9. (original) The device of claim 8, wherein the animal tissue is human soft tissue.

10. (original) The device of claim 2, wherein the shape memory material is selected from a shape memory polymer, a shape memory metal alloy of nickel, a shape memory alloy of titanium, a shape memory foam, and a shape memory ceramic.

11. (original) The device of claim 1, wherein the body comprises a cavity.

12. (original) The device of claim 11, further comprising a drug within the cavity.

13. (original) The device of claim 11, further comprising a shape memory material, wherein the cavity is at least partially defined by a shape memory material.

14. (original) The device of claim 11, wherein the body in the pre-implantation shape allows insertion of a cable member within the cavity.

15. (original) The device of claim 14, wherein the cavity is substantially constricted while the body is in the post-implantation shape.

16. (original) The device of claim 11, wherein the cavity is configured to accept an activating element.

17. (original) The device of claim 14, wherein the cavity is spaced from an outer surface of the body to limit the amount of heat that is transferred through the outer surface of the body when heat is applied by an activating element.

18. (original) The device of claim 11, wherein the cavity comprises an opening on an outer surface of the body.

19. (original) The device of claim 18, wherein the cavity comprises a recess, the recess connected with an outer surface of the body.

20. (original) The device of claim 19, further comprising a drug within the recess.

21. (original) The device of claim 1, further comprising a cable member.

22. (original) The device of claim 21, wherein the cable member is attached to the body.

23. (original) The device of claim 21, wherein the cable member is selected from an animal tissue, a synthetic fiber, a natural fiber, a polymer, a metallic wire, a bundle, and a composite.

24. (original) The device of claim 23, wherein the animal tissue is human soft tissue.

25. (original) The device of claim 1, wherein the body further comprises a cable member.

26. (original) The device of claim 25, wherein the cable member is selected from an animal tissue, a synthetic fiber, a natural fiber, a polymer, a metallic wire, a bundle, and a composite.

27. (original) The device of claim 26, wherein the animal tissue is human soft tissue.

28. (original) The device of claim 1, wherein the body is selected from a soft tissue graft fixation device, a tendon fixation device, a joint capsule repair device, a tissue tack for labral, a tissue tack for bicep repair, a suture anchor, an orthopedic screw, a fixation screw for tenodesis, and a hard tissue spacer.

29. (original) The device of claim 1, further comprising a packaging member, the packaging member configured to surround the body and configured to maintain the body in a sterile environment.

30. (original) The device of claim 29, wherein the packaging member is configured to constrain the body to the pre-implantation shape.

31. (original) The device of claim 1, wherein the body is further configured to create a load within the bone recess and normal to a surface element of the bone recess in excess of 10 KPa.

32. (original) The device of claim 31, wherein the load is less than 1GPa.

33. (original) The device of claim 11, wherein the cavity comprises a mold configured to hold a monomer solution.

34. (original) The device of claim 13, wherein the cavity comprises a mold while the shape memory material is in the pre-implantation shape.

35. (original) The device of claim 1, wherein the body is configured to be activated via receiving heat.

36. (original) The device of claim 1, wherein the body is configured to be activated via absorbing electromagnetic radiation.

37. (original) The device of claim 1, wherein the body is configured to be activated via the removing of constraints on the surface of the body.

38. (original) The device of claim 1, wherein the body further comprises an elastomer.

39. (original) The device of claim 38, wherein the body is configured to be deformed into the pre-implantation shape by a force on the body.

40. (original) The device of claim 39, wherein the force on the body is applied by a tube.

41. (original) The device of claim 39, wherein the body is configured to change from the pre-implantation shape to the post-implantation shape largely due to the removal of the force on the body.

42. (original) The device of claim 1, wherein the change from the pre-implantation shape to the post-implantation shape comprises an expansion.

43. (original) The device of claim 1, wherein the change from the pre-implantation shape to the post-implantation shape comprises a contraction.

44. (original) The device of claim 1, wherein the bone recess is a gap between a first surface of a first bone and a second surface of a second bone.

45. (original) The device of claim 44, wherein the first surface and the second surface are components of a joint.

46. (original) A method comprising:

inserting a cable member into a recess in a bone;

inserting a retention device into the recess, the retention device containing a shape memory material; and

activating the shape memory material.

47. (original) The method of claim 46, further comprising:

fixing the cable member to the recess.

48. (original) The method of claim 46, further comprising:

creating the recess in the bone.

49. (original) The method of claim 46, further comprising:

dilating the recess in the bone.

50. (original) The method of claim 46, further comprising:

compacting bone tissue surrounding the recess in the bone.

51. (original) The method of claim 46, wherein the cable member is selected from an animal tissue, a synthetic fiber, a natural fiber, a polymer, a metallic wire, a bundle, and a composite.

52. (original) The method of claim 51, wherein the animal tissue is human soft tissue.

53. (original) The method of claim 46, further comprising:

initiating a polymerization of a monomer solution.

54. (original) The method of claim 46, wherein activating comprises performing an operation on the shape memory material, selected from heating, exposing to radio frequency electromagnetic radiation, exposing to infrared electromagnetic radiation, exposing to ultraviolet electromagnetic radiation, and subjecting to a voltage differential.

55. (original) The method of claim 46, wherein the inserting the cable member operation precedes the inserting the retention device operation.

56. (original) The method of claim 46, wherein the inserting the cable member operation is performed simultaneously with the inserting the retention device operation.

57. (original) The method of claim 46, wherein after the activating operation is performed, the retention devices contacts the recess in the bone and contacts the cable member.

58. (original) The method of claim 46, wherein after the activating operation is performed, the cable member is held by the retention device and the cable member does not substantially contact the recess in the bone.

59. (original) A kit comprising:

a first bone implant, the first bone implant having a first pre-implantation shape and a first post-implantation shape different from the first pre-implantation shape;

wherein the first bone implant is configured to be inserted in a first bone recess while the first bone implant is in the first pre-implantation shape;

wherein the first bone implant is configured to fix a cable member to the first bone recess while the first bone implant is in the first post-implantation shape; and

a second bone implant, the second bone implant having a second pre-implantation shape and a second post-implantation shape different from the second pre-implantation shape;

wherein the second bone implant is configured to be inserted in a second bone recess while the second bone implant is in the second pre-implantation shape;

wherein the second bone implant is configured to fix the cable member to the second bone recess while the second bone implant is in the second post-implantation shape;

wherein the second post-implantation shape is different from the first post-implantation shape.

60. (original) The kit of claim 59, further including an insertion device configured to aid the insertion of the first bone implant.

61. (original) The kit of claim 60, wherein the insertion device comprises a tube.

62. (original) The kit of claim 60, wherein the insertion device comprises a shaft.

63. (original) The kit of claim 60, wherein the insertion device comprises a guide wire.

64. (original) The kit of claim 60, wherein the insertion device is configured to separate into a first member and a second member.

65. (original) The kit of claim 64, wherein the first member is configured to be fixed in the first bone recess.

66. (original) A method comprising:

shaping a polymer material into a post-implantation shape;

deforming the polymer material into a pre-implantation shape different from the post-implantation shape, while maintaining the temperature of the polymer material above a certain temperature; and

cooling the polymer material to below the certain temperature while holding the polymer material in the pre-implantation shape.

67. (original) The method of claim 66, wherein the pre-implantation shape is a plug.

68. (original) The method of claim 66, wherein the pre-implantation shape comprises a cavity.

69. (original) The method of claim 66, wherein the pre-implantation shape comprises a channel and a recess.

70. (original) The method of claim 69, further comprising:

filling the recess with a drug.

71. (original) The method of claim 66, wherein the certain temperature is a transition temperature of the polymer material.

72. (original) The method of claim 66, further comprising:

polymerizing a material around a cable member.

73. (original) A kit comprising:

a first solution comprising a monomer, the first solution contained in a first container;

a second solution comprising a cross-linker, the second solution contained in a second container;

wherein the second solution is configured to form a third solution if the second solution is mixed with the first solution;

wherein the third solution is capable of forming a shape memory polymer upon polymerization; and

a cable member configured to function as a soft tissue replacement in a human body.

74. (original) The kit of claim 73, further comprising a polymerizing device, the polymerizing device configured to polymerize the third solution into a shape memory polymer.

75. (original) The kit of claim 74, wherein the polymerizing device is selected from a radiation source, an ultraviolet light source, a heating source, and a source of electrical current.

76. (original) The kit of claim 73, wherein the third solution is configured to be polymerized via receiving heat from a human body.

77. (original) The kit of claim 73, wherein the cable member is further configured to be partially encapsulated in the shape memory polymer.

78. (original) The kit of claim 73, further comprising a mold configured to hold the third solution.

79. (original) The kit of claim 78, wherein the mold is further configured to allow the third solution to be polymerized by the polymerizing device.

80. (original) The kit of claim 73, further comprising a mixing member.

81. (original) The kit of claim 73, further comprising a first metering device.

82. (original) The kit of claim 81, wherein the first metering device is integrated with the first container.

83. (original) The kit of claim 81, wherein the first metering device is integrated with the second container.

84. (original) The kit of claim 73, further comprising a mixing vessel.

85. (original) The kit of claim 84, wherein the mixing vessel is integrated with a first metering device and the first metering device comprises markings.

86. (original) The kit of claim 84, wherein the mixing vessel is capable of functioning as a mold to define a shape of the third solution while it is polymerized.

87. (original) The kit of claim 73, further comprising a support configured to hold the cable member partially enveloped by the third solution while the third solution is polymerized by polymerizing device.

88. (original) The kit of claim 73, wherein the cable member is selected from an animal tissue, a synthetic fiber, a natural fiber, a polymer, a metallic wire, a bundle, and a composite.

89. (original) The kit of claim 88, wherein the animal tissue is human soft tissue.

90. (original) The kit of claim 73, wherein the monomer is tert-butyl acrylate.

91. (original) The kit of claim 73, wherein the cross-linker is polyethylene glycol dimethacrylate.

92. (original) The kit of claim 73, further comprising a photo-initiator.

93. (original) The kit of claim 92, wherein the photo-initiator is 2,2-dimethoxy-2-phenylacetophenone.

94. (original) A polymerized composition comprising:

a linear chain comprising an acrylate; and

a first cross-linker comprising a multi-functional acrylate;

wherein the polymerized composition exhibits a transition at a temperature between about -50 degrees Celsius and about 150 degrees Celsius;

wherein the polymerized composition exhibits shape memory effects.

95. (original) The polymerized composition of claim 94, wherein the polymerized composition comprises polyethylene glycol and methyl methacrylate.

96. (original) The polymerized composition of claim 95, wherein the polymerized composition is polyethylene glycol - methyl methacrylate.

97. (original) The polymerized composition of claim 94, wherein the linear chain is selected from tert-butyl methacrylate, methyl methacrylate, and 2-hydroxyethyl methacrylate.

98. (original) The polymerized composition of claim 94, wherein the first cross-linker is selected from polyethylene glycol dimethacrylate, diethylene glycol dimethacrylate, triethylene glycol dimethacrylate and ethylene dimethacrylate.

99. (original) The polymerized composition of claim 94, comprising a second cross-linker, different from the first cross-linker.

100. (original) The polymerized composition of claim 99, wherein the second cross-linker differs from the first cross-linker in composition.

101. (original) The polymerized composition of claim 99, wherein the second cross-linker differs from the first cross-linker in molecular weight.

102. (original) The polymerized composition of claim 94, containing more than about 10% of the weight of the polymerized composition as the first cross-linker.

103. (original) The polymerized composition of claim 94, wherein the multi-functional acrylate is di-functional.

104. (original) The polymerized composition of claim 94, wherein the transition is a glass transition.

105. (original) The polymerized composition of claim 94, wherein the transition is a melting point.

106. (original) The polymerized composition of claim 94, wherein the polymerized composition exhibits a transition at about 37 degrees Celsius.

107. (original) The polymerized composition of claim 94, wherein the polymerized composition exhibits a transition at a temperature between about 34 degrees Celsius and about 50 degrees Celsius.

108. (original) A polymerized composition comprising:

a first percentage by weight of a linear chain; and

a second percentage by weight of a first cross-linker;

wherein the polymerized composition exhibits shape memory effects.

109. (original) The polymerized composition of claim 108, wherein the linear chain is selected from tert-butyl methacrylate, methyl methacrylate, and 2-hydroxyethyl methacrylate.

110. (original) The polymerized composition of claim 109, wherein the first cross-linker is selected from polyethylene glycol dimethacrylate, diethylene glycol dimethacrylate, triethylene glycol dimethacrylate and ethylene dimethacrylate.

111. (original) The polymerized composition of claim 108, wherein the second percentage is greater than about 10 percent.

112. (original) The polymerized composition of claim 108, further comprising a third percentage by weight of a second cross-linker, different from the first cross-linker.

113. (original) The polymerized composition of claim 110, wherein the second cross-linker differs from the first cross-linker in composition.

114. (original) The polymerized composition of claim 110, wherein the second cross-linker differs from the first cross-linker in molecular weight.

115. (original) The polymerized composition of claim 108, wherein the polymerized composition exhibits shape memory effects.

116. (original) The polymerized composition of claim 108, wherein the first cross-linker comprises polyethylene glycol dimethacrylate.

117. (new) A surgical method comprising:

creating a recess in a bone of a patient, the bone having a bone temperature;

inserting a cable member into the bone; and

inserting an implant into the bone, the implant containing a shape memory material at an insertion temperature different than the bone temperature.

118. (new) The surgical method of claim 117, wherein inserting the implant thereby causes transfer of heat from the bone to the shape memory material.

119. (new) The surgical method of claim 118, wherein the transfer of heat to the shape memory material thereby heats the shape memory material to near a transition temperature of the shape memory material.

120. (new) The surgical method of claim 118, wherein the transfer of heat to the shape memory material thereby heats the shape memory material to the transition temperature of the shape memory material.

121. (new) The surgical method of claim 118, wherein the transfer of heat to the shape memory material thereby heats the shape memory material to above the transition temperature of the shape memory material.

122. (new) The surgical method of claim 117, wherein the inserting the implant is performed along an insertion axis.

123. (new) The surgical method of claim 122, wherein inserting the implant thereby causes the expansion of the shape memory material along a transverse axis which is at an angle to the insertion axis.

124. (new) The surgical method of claim 123, wherein the angle is greater than 45 degrees.

125. (new) The surgical method of claim 117, wherein inserting the implant thereby puts the implant and the cable member into contact.

126. (new) The surgical method of claim 117, wherein inserting the implant thereby applies a pressure between the implant and a portion of the bone.

127. (new) The surgical method of claim 126, wherein the pressure is transmitted between the implant and the bone by the cable member.

128. (new) The surgical method of claim 117, wherein the implant has a first configuration with a first diameter during insertion and a second configuration with a second diameter following insertion, the second configuration different than the first configuration and the second diameter being larger than the first diameter.

129. (new) The surgical method of claim 128, wherein the first configuration has a first generally solid tubular shape having a first length and the second configuration has a second generally solid tubular shape having a second length shorter than the first length.

130. (new) The surgical method of claim 117, wherein the shape memory material is a shape memory polymer.

131. (new) The surgical method of claim 130, wherein the shape memory polymer comprises poly-ethylene glycol and poly-methyl methacrylate.

132. (new) The surgical method of claim 130, wherein the cable is a tendon.

133. (new) The surgical method of claim 132, wherein the bone is a head of a femur.

134. (new) The surgical method of claim 117, further comprising:

contacting the implant with a fluid having a temperature different than the insertion temperature.

135. (new) The surgical method of claim 117, wherein the recess is a bone tunnel comprising a side wall and an end wall and the implant contacts at least a portion of the side wall when the implant is in the second configuration.

136. (new) A surgical method for anterior cruciate ligament reconstruction comprising:

creating a bone tunnel in a head of a femur of a patient, the bone having a bone temperature;

inserting a connective tissue into the bone tunnel; and

inserting a shape memory polymer plug into the bone tunnel wherein the plug has a first configuration for insertion and a second configuration for affixation, the second configuration comprising a radially expanded dimension that presses the connective tissue against a side wall of the bone tunnel such that the connective tissue becomes affixed in the bone tunnel and wherein the plug changes from the first configuration to the second configuration based on an activation temperature equal to or greater than the bone temperature.

137. (new) The surgical method of claim 136, wherein the bone tunnel temperature is an average temperature of the human body.

138. (new) The surgical method of claim 137, wherein the tissue is a part of a hamstring tendon of the patient.

139. (new) The method of claim 54, wherein the activating is heating, and wherein the heating comprises a transfer of heat from the bone to the shape memory material.

140. (new) The method of claim 54, wherein the activating is heating, and wherein the heating comprises flooding the retention device with a liquid bath.

141. (new) The method of claim 54, wherein the activating is heating, and wherein the heating comprises a transfer of heat from the bone to the shape memory material, and flooding the retention device with a liquid bath.